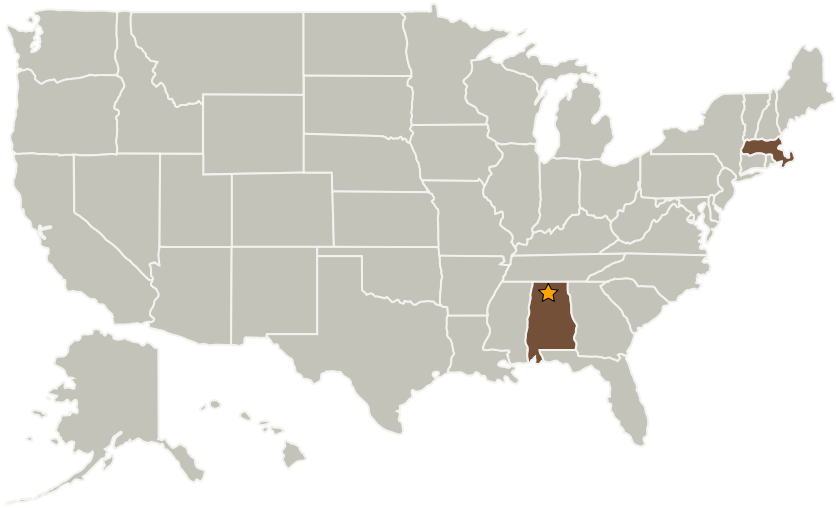
Sprayable Thermal Insulation for Cryogenic Tanks, Phase II

Completed Technology Project (2006 - 2008)

Project Introduction

The Sprayable Thermal Insulation for Cryogenic Tanks (STICT) is a thermal management system applied by either an automated or manual spraying process with less sensitivity to process chemistry and environmental parameters than current spray-on foam insulations (SOFI) like BX-265, while providing better insulation performance. The sprayable insulation based on aerogel forms an aerodynamically smooth, uniform coating with better cohesion and lower thermal conductivity. Aerogel sprayed insulation has shown in Phase I better thermal performance than polyurethane spray-on foam insulation at similar or lower areal densities. Application of thinner layers of insulation combined with greater material resistance to cracking and debonding will eliminate the generation of in-flight debris. Minimization of volatile gas blowing agents and organic components will reduce gas expansion through intracellular pressures and reduces the risk posed by shedding events during ascent. The proposed sprayable insulation can render future space transportation systems safer and more reliable. Addressing lower temperature requirements of the thermal protection system, lightweight hybrid aerogel sprayable compositions will be developed. Hybrid aerogels with various dopants will be synthesized for better compatibility with the binders or organic foams. For the most stringent thermal and mechanical loads silica aerogel silica foams will be developed as sprayable insulation.

Primary U.S. Work Locations and Key Partners



Sprayable Thermal Insulation for Cryogenic Tanks, Phase II

Table of Contents

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Marshall Space Flight Center (MSFC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Sprayable Thermal Insulation for Cryogenic Tanks, Phase II

Completed Technology Project (2006 - 2008)

Organizations Performing Work	Role	Type	Location
★Marshall Space Flight Center(MSFC)	Lead Organization	NASA Center	Huntsville, Alabama
Aspen Aerogels, Inc.	Supporting Organization	Industry	Northborough, Massachusetts

Primary U.S. Work Locations	
Alabama	Massachusetts

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX14 Thermal Management Systems
  - TX14.2 Thermal Control Components and Systems
    - TX14.2.4 Insulation and Interfaces